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EXAMINER	
QI, ZHI QIANG	
ART UNIT	**PAPER NUMBER**
2871	

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/689,633	CHOO ET AL.	
	Examiner	Art Unit	
	Mike Qi	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-17 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,5-9,13-15 and 17 is/are rejected.

7)☒ Claim(s) 2-4,10-12 and 16 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 10 recites the limitation "the photoelectron-motive force is formed by. . . . " in claim 1. There is insufficient antecedent basis for this limitation in the claim. The claim 1 does not describe the limitation for the photoelectron-motive force.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 6-9 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant admitted prior art (AAPA) in view of US 2002/0173060 A1 (Hiroki).

Claim 1, AAPA discloses (paragraphs 0006- 0012) that a method of manufacturing a liquid crystal display device comprising:

- forming thin film transistor (TFT) unit cells on a first mother substrate (i.e., the thin film transistor unit cells must be formed in the thin film transistor unit cell region of the first mother substrate);

- forming color filter unit cells on a second mother substrate (i.e., the color filter unit cells must be formed in the color filter unit cell region of the second mother substrate);
- liquid crystal layer disposed between the thin film transistor unit cell and the color filter unit cell is aligned on the thin film transistor unit cells and the color filter unit cells, and having alignment film, that is the alignment film (alignment member) formed on thin film transistor unit cells and the color filter unit cells (even the conventional alignment via rubbing the alignment film, but the alignment film as a liquid crystal alignment member formed on the thin film transistor unit cells and the color filter unit cells);
- assembling the first mother substrate and the second mother substrate to form an assembled substrate, such that the thin film transistor unit cells of the first mother substrate face the color filter unit cells of the second mother substrate, and a liquid crystal layer is disposed between the thin film transistor unit cells and the color filter unit cells;
- applying a test driving signal to the liquid crystal display panel (i.e., the liquid crystal display unit cells having thin film transistor unit cell, color filter unit cell facing the thin film transistor unit cell, and the liquid crystal layer) for testing the liquid crystal display panel;
- separating the liquid crystal display unit cells from the assembled substrate;

- a driving module for driving the liquid crystal display panel is installed, i.e., assembling a driving module with the liquid crystal display panel to form a liquid crystal display panel assembly for driving the liquid crystal display panel.

AAPA does not explicitly discloses that using a non-contact method to inspect the liquid crystal display unit cells.

However, Hiroki discloses (paragraphs 0006 – 0011) that a manufacturing method of liquid crystal display device in which using optical inspection methods to identify a faulty portion (defect) by reading with CCD a pattern formed on a substrate and by comparing the read pattern with a reference pattern, i.e., a non-contact inspection method, and especially, the optical inspection method using modulated signal enables a defective/non-defective determination of all pattern forming steps by one inspection step, thus simplifying the inspection step.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use non-contact method to inspect the liquid crystal unit cells as claimed in claim 1 for simplifying the inspection step and the defective being picked out in an earlier stage of the manufacturing process to avoid the subsequent processes, such that the inspection step is highly effective in reducing the manufacturing cost, and especially using non-contact method to simplify the inspection step.

Claims 6-8, lacking limitation is such that using first light passing through the mother substrates and the liquid crystal being transformed into a second light , and using CCD camera to detect the second light obtaining unit cell data containing first

image, and then comparing the cell data with reference data to detect unfilled region, and when detecting the unfilled region, exposing the assembled substrate at an atmospheric pressure for a predetermined time.

However, Hiroki discloses (paragraphs 0006 – 0011) that a manufacturing method of liquid crystal display device in which using optical inspection methods to identify a faulty portion (defect) by reading with CCD a pattern formed on a substrate (such as reading with CCD camera for the image formed on the second substrate) and by comparing the read pattern (the image information) with a reference pattern (the reference data). As a general available knowledge, using CCD camera to detect the image must use a light passing through the two mother substrates and the liquid crystal, and the light being transmitted would be transferred into a second light which would contain image information of the LCD filling region, such that using CCD camera to detect the image and then compare it with reference data, and that must need a predetermined time to expose the assembled substrate at an atmospheric pressure. Hiroki indicates (paragraph 0013, 0014) that using such non-contact inspection method does not require setting probes on wiring or probe terminals so as to prevent being scratched to produce minute dust that the yield would be reduced in subsequent processes, and such inspection method is simple.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use CCD camera to detect the image from the second light (having the cell data) and compare the image (cell data) with reference data as claimed

in claims 6-8 of such non-contact inspection method for preventing the minute dust and simplified the inspection process.

Claims 9 and 13-14, lacking limitation is such that applying a photoelectron-motive force as a test driving signal to each liquid crystal display unit cell, applying a test light to the liquid crystal display unit cell, and the test light passing through the cells being transformed into test image, and using CCD camera to detect the test image, and then comparing the test image with reference data.

However, Hiroki discloses (paragraphs 0006 – 0011) that a manufacturing method of liquid crystal display device in which using optical inspection methods to identify a faulty portion (defect) by reading with CCD a pattern formed on a substrate (such as reading with CCD camera for the image formed on the second substrate) and by comparing the read pattern (the image information) with a reference pattern (the reference data). As a general available knowledge, the light such as test light is an electromagnetic wave and having photoelectron-motive force. Therefore using test light passing through the liquid crystal cell would transformed into a test image, then using CCD camera to detect the test image to obtain the cell data, and then comparing the cell data with reference data as Hiroki disclosed so as to inspect the liquid crystal defect, and that is a non-contact inspection method to examine the display quality of the liquid crystal display unit cells. Hiroki indicates (paragraph 0013, 0014) that using such non-contact inspection method does not require setting probes on wiring or probe terminals so as to prevent being scratched to produce minute dust that the yield would be reduced in subsequent processes, and such inspection method is simple.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use CCD camera (using photoelectron-motive force such as light) to detect the test image (having the cell data) and compare the image (cell data) with reference data as claimed in claims 9 and 13-14 of such non-contact inspection method for preventing the minute dust and simplified the inspection process.

5. Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Hiroki as applied to claims 1, 6-9 and 13-14 above, and further in view of US 2002/0063836 A1 (Oku et al).

Claim 5, lacking limitation is such that forming a fence on a cell and filling the liquid crystal layer in a space defined by the fence, and assembling the substrates.

However, Oku discloses (paragraph 0031, Figs.2-4) that a plurality of LCD panel region are formed on a large mother substrate and then separated, and the seal material (12) (functions as the fence such as Fig.4) is disposed between the pair of mother substrates, and the space formed by the seal material (12) and the upper and lower substrates is the cell space to which liquid crystal is to be introduced, i.e., the liquid crystal is filled in a space defined by the fence and assembling the two mother substrate. Oku indicates (paragraph 0020) that curing the seal material (as the fence) disposed in the peripheral of the display area (the display cell) to prevent the substrate flexing in the display area. Even though Oku uses buffer plate, but using the seal material (functions as a fence) formed on a cell having the same function to prevent the larger substrate flexing and obtaining uniform cell gap.

Therefore, it would have been obvious to those skilled in he art at the time the invention was made to form a fence as claimed in claim 5 for obtaining a uniform cell gap.

Claim 15, AAPA discloses (paragraph 0012) that the polarizing plates are attached on the liquid crystal display panel via the polarizing plate attaching process after test process, i.e., after examining the liquid crystal unit cell, attaching a first polarizing plate on the first mother substrate and attaching a second polarizing plate on the second mother substrate, and that is conventional.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA and Hiroki as applied to claims 1, 6-9 and 13-14 above, and further in view of US 2002/0118321 A1 (Ge).

Claim 17, lacking limitation is such that an edge of each liquid crystal display unit cell is cut by a laser beam.

However, Ge discloses (paragraph 0096; Figs.11a, 11b) that using laser beam to cut the sheets (larger substrates) into smaller pieces such as LCD (1101) by cutting lines that form the edges of the smaller pieces. Ge indicates (paragraph 0010) that the heat of the laser will melt the plastic material of the two sheets (the larger substrates) as well as the adhesive material to form a sturdy sealing wall for the LCD device formed.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use laser beam cutting the edge of each liquid crystal display unit cell that is separated into each liquid crystal display unit cell as claimed in claim 17 for achieving a sturdier sealing wall for each LCD unit cell.

Allowable Subject Matter

7. Claims 2-4, 10-12 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither discloses nor teaches that a method of manufacturing a liquid crystal display device comprising various steps as claimed , more specifically, as the following:

the alignment film comprised of an alignment material having carbon-carbon double bond, and irradiating an atomic beam onto the alignment film at an angle with respect to the alignment film to transform the carbon-carbon double bond into a carbon-carbon single bond having a polarized function group, and the angle equals to a pre-tilt angle of liquid crystal molecules of the liquid crystal layer [claim 2];

the mother substrates are erected to be disposed parallel to the gravitational force direction and transferred after the thin film transistor unit cells and the color filter unit cells are formed on the two mother substrates [claim 16];

claim 10, in which applying a first light to a gate line to generate a first photoelectron-motive force and applying a second light to a data line to generate a second photoelectron-motive force, would be allowable if rewritten to overcome the

rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The closest reference such as Us 2002/0173060 A1 (Hiroki) discloses that using non-contact inspection method to inspect the liquid crystal cells by reading with CCD or the like a pattern formed on a substrate and by comparing the read pattern with a reference pattern, but the prior art of record do not disclose that the alignment material as claimed in claim 2; and applying a first light to gate line to generate a first photoelectron-motive force and applying a second light to generate a second photoelectron-motive force as claimed in claim 10; and the two mother substrates are erected after the cells formed on the two mother substrate as claimed in claim 16.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi

Mike Qi
Patent Examiner
March 30, 2005